

## REMARKS

Applicants thank the Examiner for the examination to date and respectfully request reconsideration of the present application in view of the reasons that follow.

### **Status of the Claims**

Claims 1, 3-4 and 6-13 were previously pending.

With this response, claim 1 is amended to remove a misplaced period. Claim 23 is newly added and is supported by the specification, for example, at page 20. Thus, these changes do not add new matter and entry thereof is warranted.

Upon such entry, claims 1, 3-4, 6-13 and 23 are presented for reconsideration on their merits.

### **The Present Claims Are Not Obvious**

#### *i. The Current Obviousness Standard*

The U.S. Supreme Court reaffirmed the Graham factors for determining obviousness in *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (U.S. 2007). The Graham factors, as outlined by the Supreme Court in *Graham et al. v. John Deere Co. of Kansas City et al.*, 383 U.S. 1 (1966), are: 1) determining the scope and contents of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; 3) resolving the level of ordinary skill in the pertinent art; and 4) evaluating evidence of secondary consideration.

In addition, as provided in MPEP 2141: “Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel...Such evidence, sometimes referred to as “secondary considerations,” may include evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results.” As discussed below, the cited art cannot render the claimed invention obvious.

ii. *The Present Claims Are Not Obvious Over Kinouchi Or Hirano*

Claims 1, 3-4 and 6-13 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over WO 2003/046080 (“Kinouchi”). These claims also are rejected as unpatentable over WO 2002/091507 (“Hirano”). Applicants respectfully traverse these rejections, particularly in view of the unexpected nature of the present invention.

Applicants maintain the positions as set forth in the February 25, 2011 and June 4, 2010 Replies that the present claims are non-obvious over the teachings of Kinouchi or Hirano, either alone or in combination.

Moreover, Applicants maintain the position set forth in the September 16, 2009 and February 25, 2011 Replies that the presently claimed copolymer demonstrates unexpected results, as presented in the present Specification, for example, in Example 2. Because the Office’s comments are directed solely at the unexpected results, *see* pages 2-3 of the present Office Action, this appears to be the only remaining issue at hand.

The Examiner maintains the rejection over Kinouchi and Hirano because these references “do not disclose the use of a fluorinated copolymers [and] therefore do not contain the octafluorobiphenyl linking groups shown in the structure [of Example 2 of the specification],” which was presented as the basis for the unexpected results. See, Office Action, p. 3.

To further demonstrate the unexpected properties of the present invention, the following table compares the proton conductivity of Hirano’s Example 1 and Kinouchi’s Synthesis Example 2 with Examples 2-6 of the present specification:

| Example  | Ion Exchange Capacity (meq/g) | Proton Conductivity (S/cm) under a relative humidity of 90% |                      |                      |
|--|-------------------------------|---|----------------------|----------------------|
|  |                               | 70 °C   | 80 °C                | 90 °C                |
| Hirano Ex. 1<br>(no apparent fluorinated linking group)        | 1.78                          | $4.3 \times 10^{-2}$  |                      | $6.5 \times 10^{-2}$ |
| Kinouchi Syn. Ex. 1<br>(no apparent fluorinated linking group) |                               |   |                      |                      |
| Example 2<br>(fluorinated linking group)                       | 1.51                          |   | $1.1 \times 10^{-1}$ |                      |
| Example 3<br>(fluorinated linking group)                       | 1.76                          |   | $1.7 \times 10^{-1}$ |                      |
| Example 4<br>(fluorinated linking group)                       | 1.60                          |   | $1.1 \times 10^{-1}$ |                      |
| Example 5<br>(no fluorinated linking group)                    | 1.60                          |   | $9.7 \times 10^{-2}$ |                      |
| Example 6<br>(fluorinated linking group)                       | 1.60                          |   | $1.1 \times 10^{-1}$ |                      |

As illustrated by the table, the block copolymers of Hirano's and Kinouchi's examples do not appear to have a fluorinated linking group. Examples 2-4 and 6 of the present specification describe fluorinated aromatic linking groups, but Example 5 of the present specification does *not* have a fluorinated linking group.

Hirano discloses that the sulfonated block copolymer BPS-1 of Example 1 has proton conductivities of  $4.3 \times 10^{-2}$  S/cm and  $6.5 \times 10^{-2}$  S/cm when detected at temperatures of 70 °C and 90 °C, respectively. Kinouchi's block copolymer in Synthesis Example 1 possesses the same conductivities because the two examples are substantially the same. Moreover, the skilled artisan would recognize that conductivities detected at temperatures in between these two temperatures, including 80 °C, would fall between  $4.3 \times 10^{-2}$  S/cm and  $6.5 \times 10^{-2}$  S/cm. Thus, the skilled

artisan, having knowledge of Hirano and Kinouchi, would have expected the claimed block copolymers to possess these same proton conductivities. As described below, however, this is not the case.

The table indicates that the proton conductivities of the claimed block copolymers in Examples 2-6 of the present specification are all higher than the conductivities of Hirano and Kinouchi. This includes the block copolymer of Example 5, which, like the block copolymers of Hirano and Kinouchi, does not have a fluorinated linking group. Although the conductivities of Examples 2-6 were detected at 80 °C, the skilled artisan would recognize that these conductivities can be compared with those described in Hirano and Kinouchi, because, as noted above, the block copolymers of Hirano and Kinouchi would have a conductivity at 80 °C falling between  $4.3 \times 10^{-2}$  S/cm and  $6.5 \times 10^{-2}$  S/cm. All of the conductivities of the present examples are higher than these conductivities. Because the skilled artisan would have expected the claimed block copolymers to have the conductivities possessed by the copolymers of Hirano and Kinouchi, Examples 2-6 demonstrate that the conductivities presented by the presently claimed block copolymer are truly unexpected.

Applicants, therefore, respectfully request that the obviousness rejections be withdrawn.

### CONCLUSION

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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